

# *OPEN HOUSE*



**KALIUM CHEMICALS LIMITED**





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# Welcome

We at Kalium have been well received by the people of Saskatchewan, and in particular, by the people of the Moose Jaw-Regina area. For a new industry, this is helpful and appreciated and we wish, on the occasion of your visit to our facilities, to repay to some extent the kind interest you have shown us.

This booklet has been prepared to assist in answering some of your questions regarding our operation; please do not hesitate to ask any additional questions you may have.

Again, on behalf of Kalium Chemicals Limited and its employees: Welcome.

G. J. Lambillotte,  
Plant Manager.



Kalium's white, dust-free potash is shown being stored in one of the five beehive type storage bins.

# WHAT

The term potash generally refers to any potassium mineral sold for its potassium content. The chief ones are potassium chloride (muriate of potash), potassium sulfate (sulfate of potash) and a mixture of potassium sulfate and magnesium sulfate (sulfate of potash-magnesia). In early days a potassium compound, potassium carbonate, was produced from solutions leached from wood ashes evaporated in iron pots — hence the term "pot ashes." In 1857, soluble potash minerals found in Germany were recognized as valuable for fertilizer use, and the minerals have since been the source of potash for fertilizer and chemical use.

About 95 per cent of the world's potash is used as fertilizer and 5 per cent is used to make certain grades of glass and liquid soap, in bleaching to make oxalic acid, and as a reagent in analytical chemistry. Also, it is used in the manufacture of matches, vat dyes, television tubes, synthetic rubber, photographic film and insecticides.

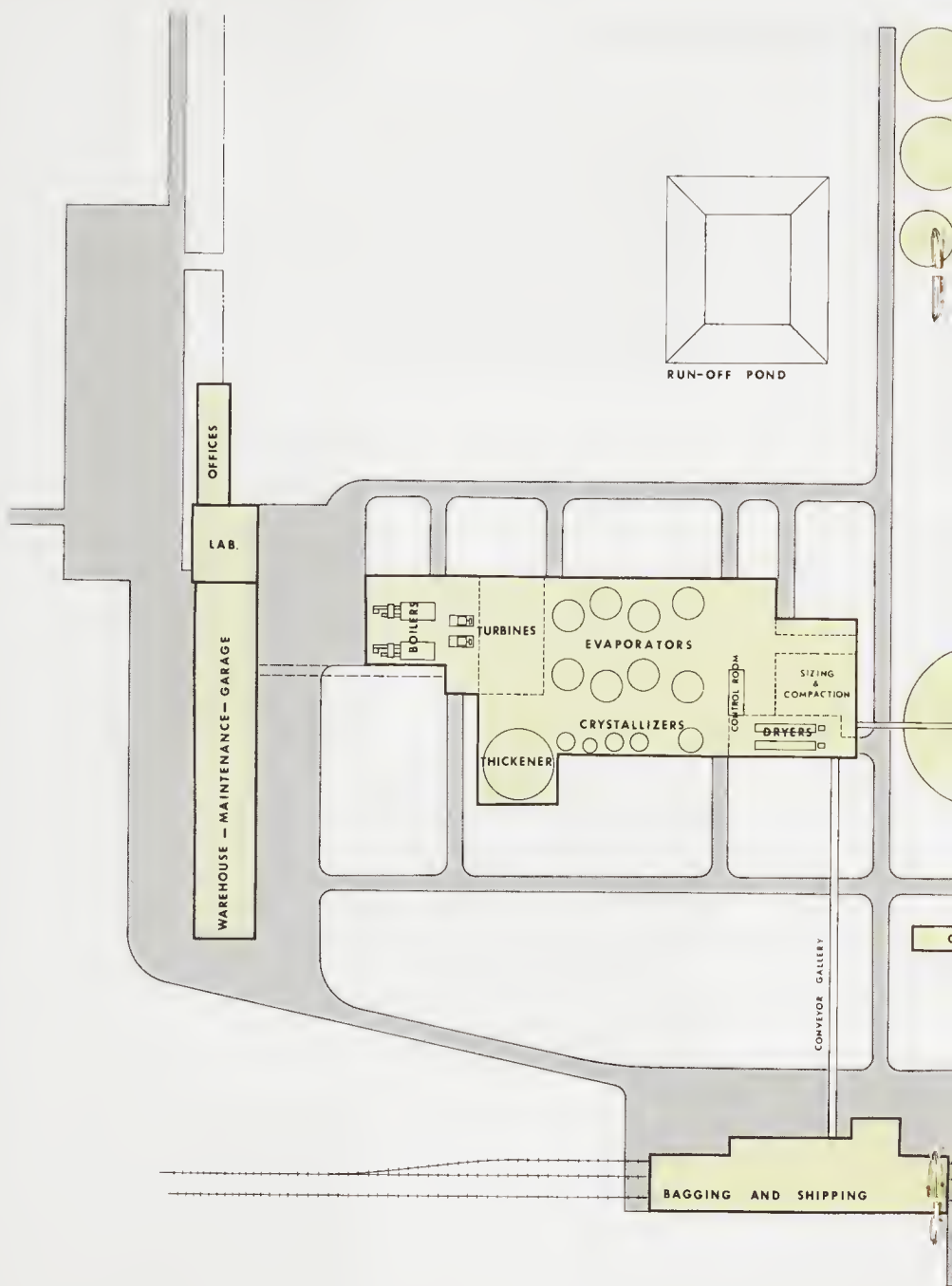
In Saskatchewan, potash ores are derived from ancient seas and are found in three fairly continuous and consistent layers of sylvinite ores in the upper part of an area known geologically as the "Prairie Evaporites." It is estimated that the potash was formed about 350 million years ago. In later times the

# IS POTASH ?

deposits were overlain with other marine sediments and movements of the earth's crust tilted the deposits. Glaciers and rivers did their work and latterly the surface was covered with a carpet of prairie grasses.

Starting around the turn of the century, the native grasses were plowed up and cultivated grains were sown. The rich black soil was to make Saskatchewan one of the chief granaries of the world. But for fifty years no one suspected that beneath the rich soil lay a material — potash — that would help the rest of the world feed itself.

The deposits in Saskatchewan extend in a broad belt 450 miles long and up to 150 miles wide and is the world's largest known high grade potash deposit. At the northern boundary, which follows a line from Unity through Saskatoon to Yorkton and into Manitoba, potash is found at about the 3,000 foot level. The bed extends southward into North Dakota and Montana. The depth of the deposit increases from 3,000 feet at the northern edge to 7,000 feet at the U.S. border. While only a band of some 25 to 30 miles wide along the shallow northern fringe can be mined by conventional shaft methods, the large heart of this great deposit can now be mined by the solution technique developed by Kalium.





SOLUTION TANK



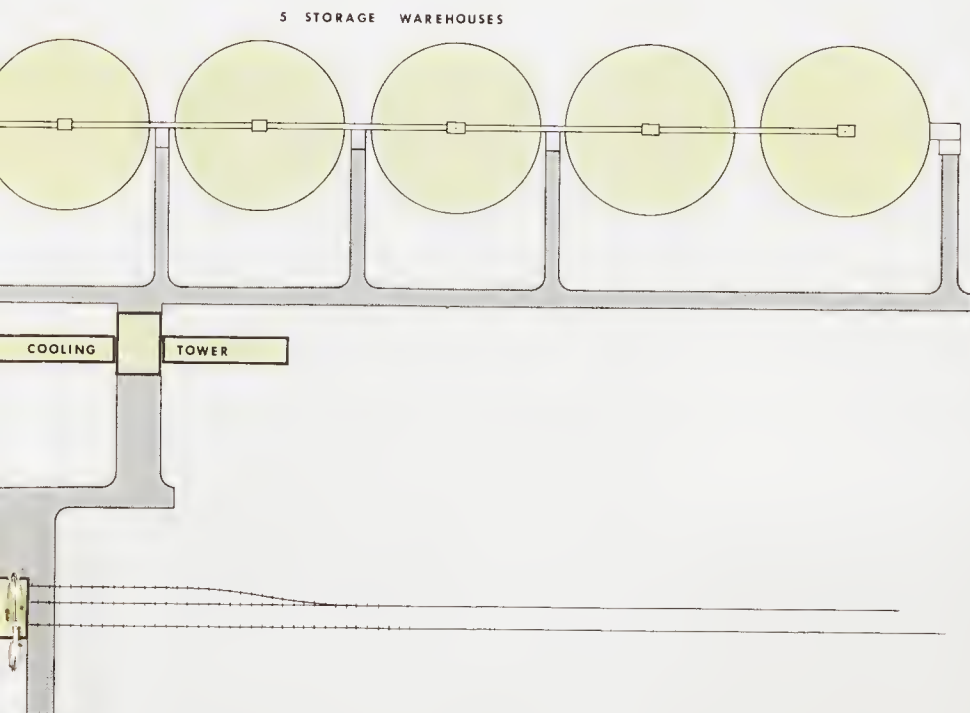
SOLUTION TANK



RIVER WATER STORAGE

# KALIUM CHEMICALS LIMITED

## PLANT LAYOUT



# KALIUM AND SOLUTION MINING

In 1960, Kalium engineers began initial test drilling into the potash deposits. Oil drilling rigs appeared on the wheat land between Regina and Moose Jaw and bore holes were made into the deposits.

In 1961, an experimental pilot plant was established at the surface to pump water down into the bore holes and to examine and analyze the potash-bearing solution that was brought up.

Kalium's efforts were complex. It was necessary to penetrate entire saline series, shale and limestone and bring to the surface a satisfactory potash solution. To do so economically took several years of research, many dollars, a thorough understanding of physical chemistry and experience in manipulating and controlling machinery at depths of more than a mile below the surface. Many techniques were used — seismic sounding, neutron activation, etc. — and some were devised by Kalium's mining engineers, to locate accurately the beds of potash ore that are intimately intermingled with beds of common salt, shale, sandstone, limestone, and other sedimentary deposits of no economic value.



A view of the quality-control laboratory facilities located in the Administration Building.



Where Solution Mining begins. Pictured is a drilling rig used to drill bore holes into the potash deposits.

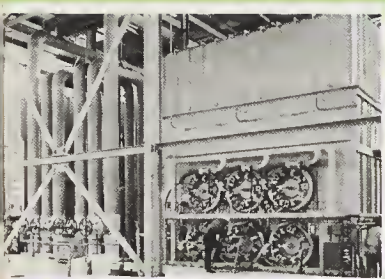


The use of solution mining techniques developed by Kalium allows economical mining of potash at depths too deep to be mined in any other way. This has the effect of substantially increasing the total reserves of mineable potash.

Translated into other terms, at present world consumption rates, the use of solution mining techniques to recover potash from the Saskatchewan deposits can supply the world for at least the next 8,000 years.



Bulk loading into covered hopper cars is carried out in the Loadout Building. In this manner, up to 100 cars of product a day may be shipped.



Steam for the process and for the plant's electrical energy requirements is produced from two natural gas-fired boilers.



Operating personnel control the refining process from this 44 foot control console.



A view showing product being conveyed to the Loadout Building for shipment.

## The REFINING PROCESS

To refine the potash-bearing solution mined from the deposits a mile below the surface, Kalium has constructed one of the largest and most modern plants in Western Canada. Construction of the refinery began in May, 1963, and less than 15 months later, on August 3, 1964, the first product was produced.

In a process where large quantities of water must be removed from the feed solution, evaporation and the heat to accomplish it are of major importance. Kalium uses two lines of multiple effect evaporators — eight in all. These evaporators are the largest units of processing equipment in the plant. Steam for the operation is derived from natural-gas-fired boilers. All the plant's electrical requirements are produced from two turbine generators.

In the evaporation process large quantities of waste salt are precipitated out of the solution. The salt is disposed of in a two million

square yard pond, after excess moisture is removed by centrifuges. The potash crystals are finally formed in the quadruple effect crystallizers before drying and screening.

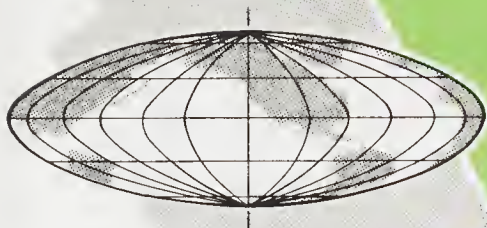
Kalium's evaporation-crystallization process allows close control of particle size and produces a non-dusting product. Process design has made the refinery a highly automated operation, controlled by personnel from a 44 foot instrument panel.

The crystallized potash is dried and separated into its various particle sizes by a series of screens and is handled by an elaborate system of elevators and conveyors. The dry, sized potash is then sent to storage or direct to the loading operation.

Five beehive type storage bins will each hold 37,500 tons of potash. With a diameter of 190 feet and an overall roof height equal to an eight storey building, each bin has a floor area of 27,000 square feet.

From storage a conveyor takes the product to a loadout tower for bulk loading in covered hopper or box cars. Facilities for bag loading are also available and some shipments are made in this manner.

An office building, adjacent to the refinery, contains 43,000 square feet of floor space for administrative and engineering personnel as well as for quality control laboratories. A maintenance building adjoining the office building has 35,000 square feet for floor space.



## MARKETS

Kalium and other Saskatchewan producers are counting on a sustained world demand for potash fertilizers. Used at a rate of about 12 million tons in 1964, consumption is expected to continue to increase in the future. The drive for food by a burgeoning world population, economical use of land, the desire and necessity for higher productivity per acre form the base for such predictions.

Sales of potash are made to bulk distributors of fertilizers, rather than to individual consumers. The major market areas are the southern and mid-western United States, Europe and Asia. The markets for potash in Canada are Ontario, Quebec and the Maritimes.

Kalium's sales headquarters is in New York City, with regional sales offices in Atlanta, Georgia; Chicago, Illinois, and Montreal, Quebec.





# KALIUM CHEMICALS LIMITED

REGINA

SASKATCHEWAN